

# Work Order ID 53341

November 2, 2009 8:08:44 AM

Page 1

Item ID: D212-664-207

Accept

Revision ID: A

Item Name: Crosstube Low Standard Aft

Setup Start

Stop

Start Date: 02/11/2009 Start Qty: 1.00

Required Date: 10/11/2009 Req'd Qty: 1.00

Cust Item ID:

Customer:

Reference:

Approvals:

Process Plan:

Date: 09-11-2

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run Start

Stop

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Draw  
Number

Draw  
Rev.

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

Draw Nbr

Revision Nbr

D212-664-247

Rev A

0.00



DC

Document Control

DOCUMENT CONTROL

Memo

0.00

Photocopy bluefile and create labels as per PPP D212-664-207 CHG001

5 10/01/09

HJ for BG 10/01/07

110



Packaging

Packaging

Pick Kit

Packaging

0.00

Memo

0.00

10-1-8 SP

120



CNC Bend 2

CNC Alpha 160 Bender

BENDING MACHINE - CROSSTUBES

Memo

0.00

Bend tube as per Dwg D212-664-247 using CNC bender program and Folio FT

TV MB 09-12-09



# Work Order ID 53341

November 2, 2009 8:08:44 AM



Page 2

Item ID: D212-664-207

Accept



Setup Start



Revision ID: A

Stop



Item Name: Crosstube Low Standard Aft

Start Date: 02/11/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 10/11/2009 Req'd Qty: 1.00

Customer:

Reference:

Run Start



Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Stop



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Draw  
Number

Draw  
Rev.

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

130



QC

Quality Control

QC15- Crosstube Dimensional Check

0.00

27 80912109

0.00



Memo

140



Crosstubes

Crosstubes

Crosstubes

0.00

0.00

Memo

1-Drill Rivet holes as per Dwg.D212-664-247 using DT8972.

2-Drill pilot holes in tube as per Dwg D212-664-247 using DT8550 and DT8551

3-Ream hole to finish size in tube as per Dwg D212-664-247

4-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-664-247

5-Scribe part # and batch # using vibrating stylus as per Dwg D212-664-247

MB  
09-12-14

AWM 9-12-28

MB  
09-12-14

**Work Order ID 53341**

November 2, 2009 8:08:44 AM



Page 3

Item ID: D212-664-207

Accept



Setup Start



Revision ID: A

Stop



Item Name: Crosstube Low Standard Aft

Start Date: 02/11/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 10/11/2009 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Stop



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	----------------	--------------	--------------	---------------	---------------	------------------	----------------

150

Crosstubes Chemical Conversion

0.00



HandFXtube

Memo

0.00

Hand Finishing Crosstubes

Chemical Conversion Coat Tube &amp; Cuffs

1 - 12.28

160

QC3- Inspect Part Finish

0.00



QC

Memo

0.00

Quality Control

1 - 12.29

170

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

Quality Control

1 - 12.29

**Work Order ID 53341**

November 2, 2009 8:08:44 AM

Page 4

Item ID: D212-664-207

Accept

Revision ID: A

Item Name: Crosstube Low Standard Aft

Start Date: 02/11/2009 Start Qty: 1.00

Required Date: 10/11/2009 Req'd Qty: 1.00

Reference:

Cust Item ID:




Customer:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180  Outsource2	Outsource process - NDT per QSI038 4.1	0.00							
	Memo	0.00							
	Liquid Penetrant Inspection as per QSI 038 Issue P/O: <u>11012</u> LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order								
190  Packaging	Receive & Inspect for Damage & Mat'l Certs	0.00							
	Packaging								
	Memo	0.00							
	Ensure copy of NDT results attached to work order.								
200  QC	QC5- Inspect part completeness to step on W/O	0.00							
	Memo	0.00							
	Inspect for damage & ensure results are as per Dwg D212-664-207								

CL 10/01/04 ①

PL 10/01/04 ①

MA 10 01 04 ①

# Work Order ID 53341

November 2, 2009 8:08:44 AM



Page 5

Item ID: D212-664-207

Accept



Setup Start



Revision ID: A

Stop



Item Name: Crosstube Low Standard Aft

Start Date: 02/11/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 10/11/2009 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Stop



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	----------------	--------------	--------------	---------------	---------------	------------------	----------------

210

0.00



Crosstubes

*MT*

*10*

*01*

*04*

Crosstubes

Memo

0.00

Crosstubes

1-Rivet Cuffs as per Dwg D212-664-247. with Sika flex in Between tube & Cuff

A/R SIKAFLEX -241/-291 BATCH: 112395

220

0.00



Spray Painting per QSI005 4.2

SprayPaint

*MT*

*10*

*01*

*05*

SprayPaint

Memo

0.00

Spray Painting

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube with White Imron as per QSI 005 4.2

PRIME:

Start Time: 8:30

Finish Time: 9:30

PAINT:

Start Time: 2:30

Finish Time: 3:30

# Work Order ID 53341

November 2, 2009 8:08:44 AM



Page 6

Item ID: D212-664-207

Accept



Setup Start



Revision ID: A

Stop



Item Name: Crosstube Low Standard Aft

Start Date: 02/11/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 10/11/2009 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Stop



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	----------------	--------------	--------------	---------------	---------------	------------------	----------------

230

QC14- Inspect Spray Paint

0.00



QC

Memo

0.00

Quality Control

Wrap in plastic bag to protect from scratches

21 10-01-06

240

Crosstubes

0.00



Crosstubes

Memo

0.00

Crosstubes

1- Assemble as per Dwg D212-664-247

2- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe

3- Instal support with magnobond 6398 per dwg D212-664-247, cure for 12hrs before packaging.

Time & date of application: 11:00 10/01/06

Batch: 112417

EXP. DATE 01/2011

Torave. ml 10/01/07 ①

ml 10 01 06 ①

# Work Order ID 53341

November 2, 2009 8:08:44 AM



Page 7

Item ID: D212-664-207

Accept



Setup Start



Revision ID: A

Stop



Item Name: Crosstube Low Standard Aft

Start Date: 02/11/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 10/11/2009 Req'd Qty: 1.00

Customer:

Reference:

Run Start



Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Stop



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Draw  
Number

Draw  
Rev.

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

250

QC5- Inspect part completeness to step on W/O

0.00

27 80 10/10/07



QC

Memo

0.00

Quality Control



255

Pick Kit

0.00



Packaging

Memo

0.00

Packaging

10-18 SP

260

QC4- 100% Inspect kits for completeness

0.00

27 80 10/10/07



QC

Memo

0.00

Quality Control





**Work Order ID 53341**

November 2, 2009 8:08:44 AM



Page 8

Item ID: D212-664-207

Accept



Setup Start



Revision ID: A

Stop



Item Name: Crosstube Low Standard Aft

Start Date: 02/11/2009 Start Qty: 1.00



Cust Item ID:

Required Date: 10/11/2009 Req'd Qty: 1.00

Customer:

Reference:

Run Start



Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Stop



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run HoursDraw  
NumberDraw  
Rev.Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

270



Packaging

Packaging

0.00

Memo

0.00

Packaging

Identify and pack for shipping as per PPP D212-664-207

MVA

280



QC

QC21- Final Inspection - Work Order Release

0.00

Memo

0.00

Quality Control

# Picklist Print

November 2, 2009 8:08:53 AM

Page 1

Work Order ID: 53341

Parent Item: D212-664-207RevA

Parent Item Name: Crosstube Low Standard Aft.

Start Date: 02/11/2009

Required Date: 10/11/2009

Comments:

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
---------------------------------	------------------------	---------------	-------------	---------------------	------------------	-----------------	--------------------	----------------	--------------------------	---------------	----------------	--------

D212-664- 207TRNRevA		Manufactured	No			110	Each	6.0000	1.0000			
-------------------------	--	--------------	----	--	--	-----	------	--------	--------	--	--	--



Crosstube Turning Detail

Warehouse	Loc Qty	Loc Code
-----------	---------	----------

Location

Main Warehouse

FG

6

50678

1

50688

1

50879

1

50880

1

51377

1

51378

1

D3660-1RevB

Manufactured No

140

Each

9.0000

2.0000



CUFF

Warehouse	Loc Qty	Loc Code
-----------	---------	----------

Location

Main Warehouse

ST

9

51394

9

R-53875 MB 09-12-08

MB 09-12-10

2K

# Picklist Print

November 2, 2009 8:08:53 AM

Work Order ID: 53341



Parent Item: D212-664-207RevA



Parent Item Name: Crosstube Low Standard Aft

Start Date: 02/11/2009

Required Date: 10/11/2009

Comments:

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
CR3212-4-06		Purchased	No			220	Each	1,706.000	44.0000			
CHERRY RIVET												

Warehouse  
Location

Loc Qty

Loc Code

Main Warehouse

ST

1706

107534

6

112492

200

112612

500

112724

200

112794

800

*m* 10/01/04

D3595-063-530RevA

Manufactured

No

240

Each

204.0000

4.0000



RUBBER CUSHION

Warehouse  
Location

Loc Qty

Loc Code

Main Warehouse

ST

204

40780

2

44998

2

50030

96

51776

104

*m* 10 01 06

# Picklist Print

Page 3

November 2, 2009 8:08:53 AM

Work Order ID: 53341



Parent Item: D212-664-207RevA



Parent Item Name: Crosstube Low Standard Aft

Start Date: 02/11/2009

Required Date: 10/11/2009

Comments:

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
D2940-1RevB		Manufactured	No			240	Each	40.0000	2.0000			

Support

<u>Warehouse</u>	<u>Loc Qty</u>	<u>Loc Code</u>
<u>Location</u>		
Main Warehouse		
ST	40	
24367	4	
25594	2	
<u>45203</u>	14	
47748	20	

70 01 06

# Picklist Print

Page 4

November 2, 2009 8:08:53 AM

Work Order ID: 53341

Parent Item: D212-664-207RevA

Parent Item Name: Crosstube Low Standard Aft

Comments:

Start Date: 02/11/2009

Required Date: 10/11/2009

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
MS21920-28		Purchased	No			240	Each	170.0000	4.0000			
Clamp(per MIL-DTL-8783C)												

<u>Warehouse</u>	<u>Loc Qty</u>	<u>Loc Code</u>
<u>Location</u>		
OFFSHORE		
FG	5	
105884	5	
Main Warehouse		
ST	165	
106864	5	
108466	9	
108847	7	
109181	14	
109965	2	
111281	2	
111734	26	
112624	50	
112863	50	

10 01 06

D3428-1RevA.

Manufactured No

255

Each

21.0000

1.0000

Placard

<u>Warehouse</u>	<u>Loc Qty</u>	<u>Loc Code</u>
<u>Location</u>		
Main Warehouse		
ST096	21	
50790	21	

10-1-85

10

# Picklist Print

November 2, 2009 8:08:53 AM

Work Order ID: 53341

Parent Item: D212-664-207RevA

Parent Item Name: Crosstube Low Standard Aft

Comments:

Start Date: 02/11/2009

Required Date: 10/11/2009

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
MS21042L6 Nut		Purchased	No			255	Each	623.0000	6.0000			

Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

ST

623

105077

22

110002

5

111548

8

111578

400

112492

188

AN960JD616

Purchased

No

255

Each

798.0000

18.0000

Washer

Warehouse

Loc Qty

Loc Code

Location

Main Warehouse

ST

798

112314

298

112828

500

# Picklist Print

Page 6

November 2, 2009 8:08:53 AM

Work Order ID: 53341

Parent Item: D212-664-207RevA

Parent Item Name: Crosstube Low Standard Aft

Comments:


Start Date: 02/11/2009

Required Date: 10/11/2009

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Remaining Qty To Pick	Qty Issued	Date Issued	Status
---------------------------------	------------------------	---------------	-------------	---------------------	------------------	-----------------	--------------------	----------------	--------------------------	---------------	----------------	--------

AN6-40A  Bolt		Purchased	No			255	Each	108.0000	4.0000			
--	--	-----------	----	--	--	-----	------	----------	--------	--	--	--

Warehouse Loc Qty Loc Code

Location


Main Warehouse

ST 108

112612 8

112679 50

112828 50

AN6-41A  Bolt		Purchased	No			255	Each	70.0000	2.0000			
--	--	-----------	----	--	--	-----	------	---------	--------	--	--	--

Warehouse Loc Qty Loc Code

Location

Main Warehouse

ST 70

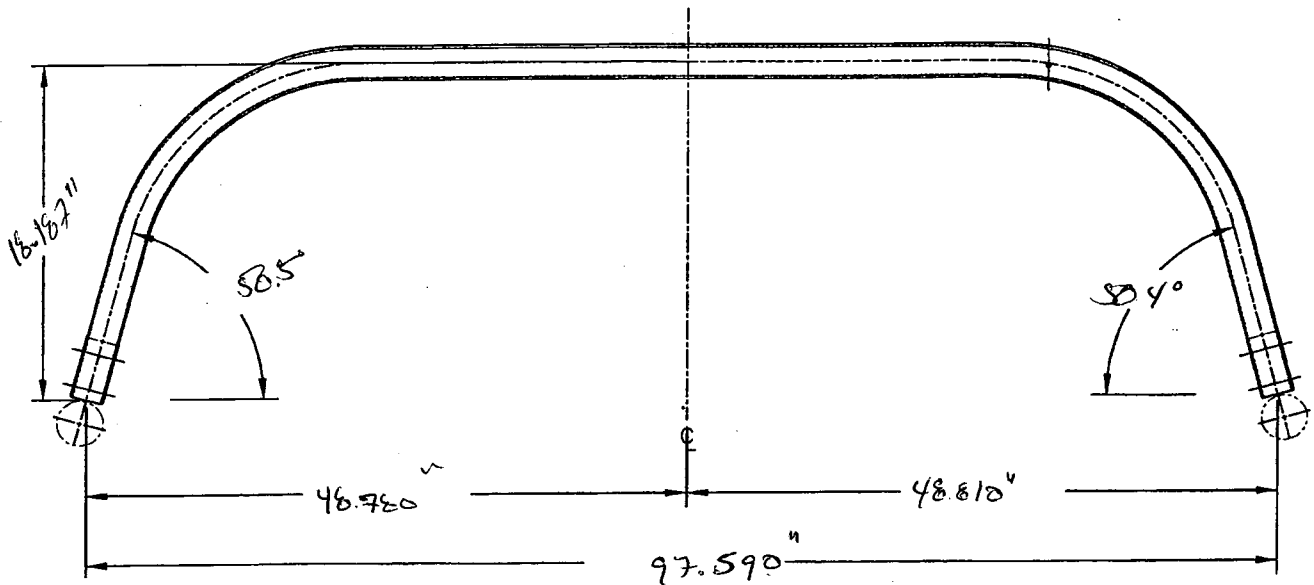
111605 25

112489 20

112805 25

DART AEROSPACE LTD		Work Order:	53341
Description: Crosstube Low Aft (205/212)		Part Number:	D212-664-207
Inspection Dwg: D212-664-247 Rev: A		Page 1 of 1	

Required Dimension	Min	Max
Height	18.16	18.42
1/2 Span	48.55	48.81
Angle	49	52
Total Span	97.1	97.62



Comments

QC15 Inspection	S
Date	09/12/09

Rev	Date	Change	Revised by	Approved
A	08.02.29	New Issue	KJ/JM	<i>[Signature]</i>





**PARTS LIST:**


Qty	Part Number	Description
X	D212-664-247	CROSSTUBE ASSEMBLY (205/212 LOW AFT)
1	D6008-132	CROSSTUBE
2	D2940-1	SUPPORT
4	D3595-063-530	RUBBER CUSHION
2	D3660-1	CUFF
4	MS21920-28	CLAMP (OR MS21920-30)
44	CR3212-4-06	RIVET (OR M7885/3-4-06)
A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
A/R	SIKAFLEX-241/-291	SEALANT (OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT)

**GENERAL NOTES:**

- 1) MATERIAL: MANUFACTURED FROM D6008-132  
FINISHED LENGTH = 128.27±0.020 (BEFORE BENDING/TRIMMING)
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) ALL DIMENSIONS ARE IN INCHES
- 5) PART IS SYMMETRIC ABOUT CENTERLINE.
- 6) WHEN MACHINING TAPER, RUN-OFF PART AT STOCK. BLEND OUT EDGE LONGITUDINALLY,  
TRANSITION SHOULD BE SMOOTH.
- 7) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE  
TO BENDING IS 6% BASED ON O.D., EXCEPT UP TO 10% IS ALLOWED IN AREA NOTED.
- 8) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 9) SCRIBE DART PART NUMBER AND BATCH NUMBER ON INNER SURFACE OF TUBE WITH A  
VIBRATING STYLUS.
- 10) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE  
OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS  
SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT  
LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 11) APPLY A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2940-1  
THAT WILL BE IN CONTACT WITH THE CROSSTUBE. LET CURE FOR 12 HOURS AFTER  
INSTALLATION AND PRIOR TO PACKAGING.
- 12) INSTALL MS21920-28 CLAMPS (OR -30) WITH D3595-063-530 RUBBER CUSHIONS TO SECURE  
D2940-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE  
CROSSTUBE SUPPORT.
- 13) TORQUE CLAMPS 80 TO 100 IN.-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY  
AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.
- 14) INSTALL D3660-1 CUFF AFTER CHEMICAL CONVERSION COAT BUT BEFORE PAINT, WITH A  
LAYER OF SIKAFLEX-241/-291 OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT BETWEEN  
CUFF AND CROSSTUBE. SEAL EDGE OF CUFF TO ENSURE NO GAPS.
- 15) TOUCH-UP HOLES WITH CHEMICAL CONVERSION COAT.

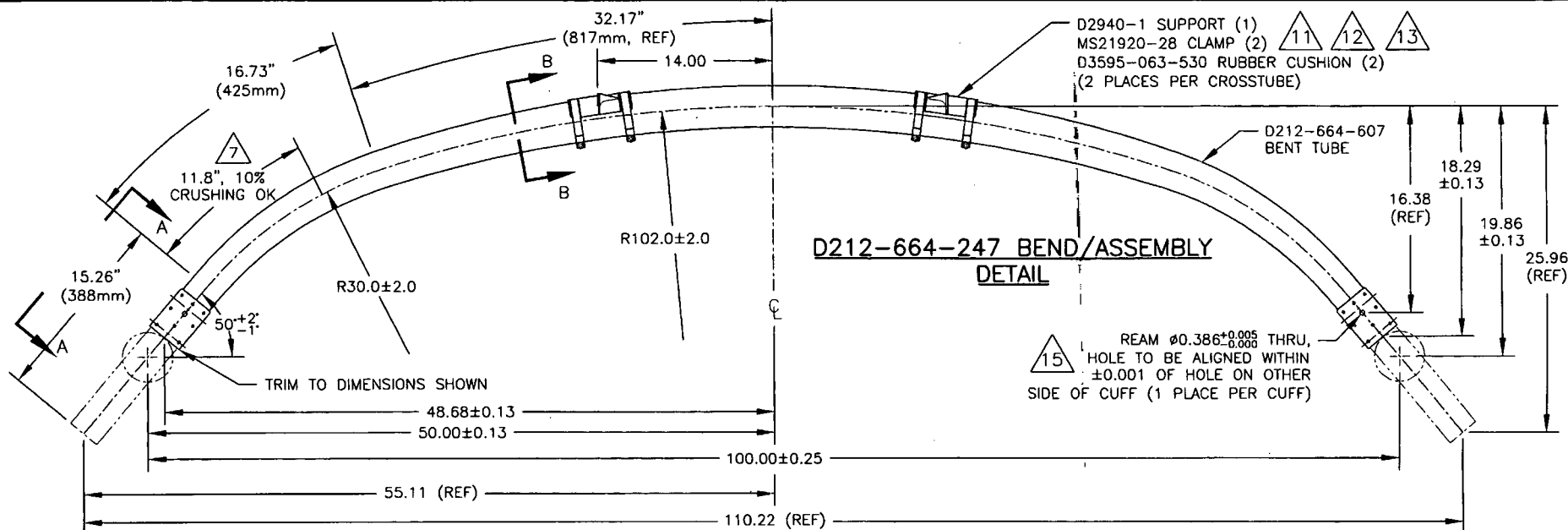
SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER  
NO. 53341  
*BS 09 11-2*

DEO ATTACHED  
RELEASED  
*09.24*

A		07.07.07	NEW ISSUE	
DESIGN	<i>qp</i>	DRAWN BY	<i>qp</i>	 <b>DART AEROSPACE LTD.</b> <small>HAWKESBURY, ONTARIO, CANADA</small>
CHECKED	<i>ph</i>	APPROVED	<i>ph</i>	
DATE		07.07.07		DRAWING NO. <b>D212-664-247</b>
TITLE		CROSSTUBE (205/212 LOW AFT)		REV. A SHEET 1 OF 3 SCALE NTS

COPYRIGHT © 2007 BY DART AEROSPACE LTD.

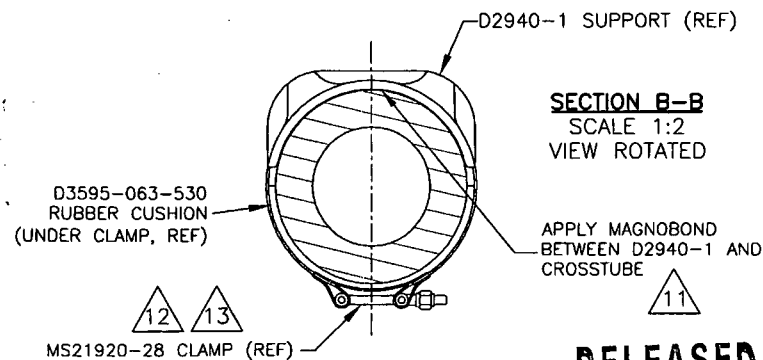
THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.



### D212-664-247 BEND/ASSEMBLY DETAIL

15 REAM  $\varnothing 0.386^{+0.005}_{-0.000}$  THRU,  
HOLE TO BE ALIGNED WITHIN  
 $\pm 0.001$  OF HOLE ON OTHER  
SIDE OF CUFF (1 PLACE PER CUFF)

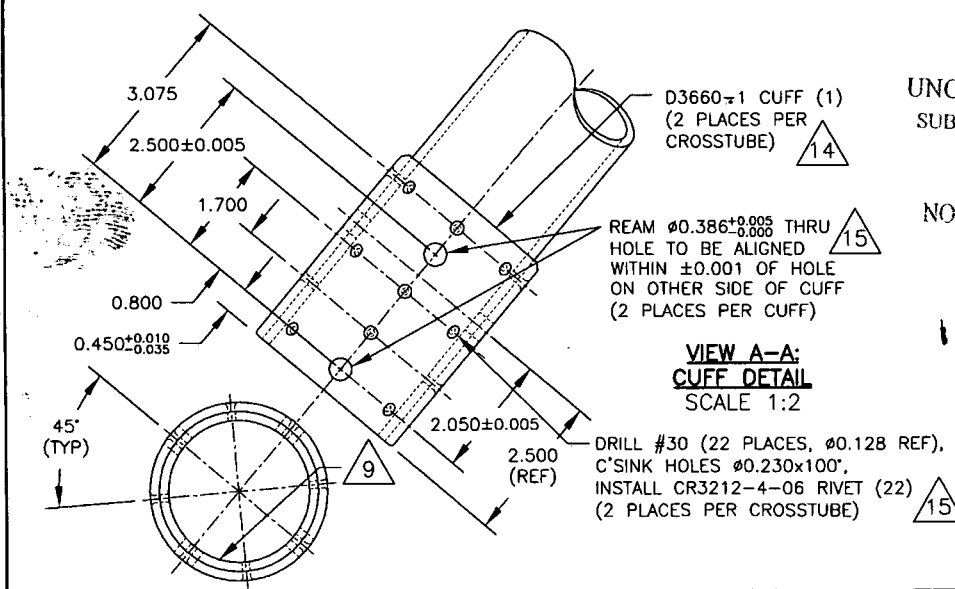
SHOWING  
REVISIONS  
ENGINEER  
UNCONTROLLED  
SUBJECT TO  
WITHDRAWAL  
WORK ORDER  
NO. 533.41



### SECTION B-B SCALE 1:2 VIEW ROTATED

APPLY MAGNOBOND  
BETWEEN D2940-1 AND  
CROSSTUBE

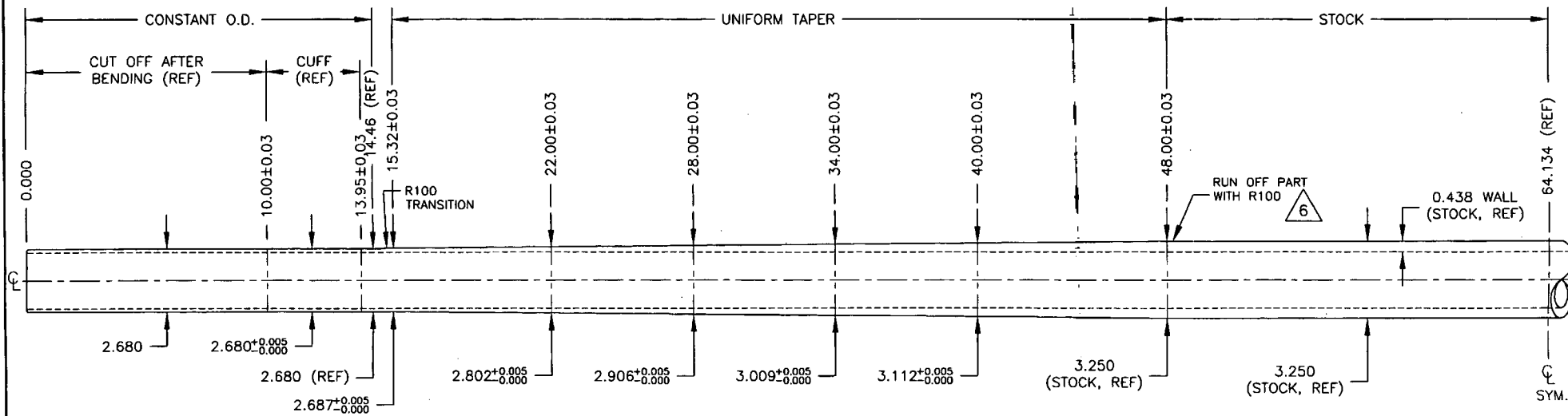
DETACHED RELEASED  
07.07.24



COPYRIGHT © 2007 BY DART AEROSPACE LTD.

THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL  
AND IS SUPPLIED ON THE EXPRESS CONDITION  
THAT IT IS NOT TO BE USED FOR ANY PURPOSE  
OR COPIED OR COMMUNICATED TO ANY OTHER  
PERSON WITHOUT WRITTEN PERMISSION FROM  
DART AEROSPACE LTD.

DESIGN 97	DRAWN BY 97	<b>DART</b> DART AEROSPACE LTD. HAMMERSBURY, ONTARIO, CANADA	REV. A
CHECKED R4	APPROVED R4	DRAWING NO. D212-664-247	SHEET 2 OF 3
DATE 07.07.07	TITLE CROSSTUBE (205/212 LOW AFT)	SCALE 1:8	



# D212-664-247 MACHINING DETAIL

SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER  
NO. 53341

RELEASED  
07.09.24  
DEO ATTACHED

COPYRIGHT © 2007 BY DART AEROSPACE LTD.		DESIGN	DRAWN BY	<b>DART</b>	DART AEROSPACE LTD. HAWKESBURY, ONTARIO, CANADA
THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.		CHECKED	APPROVED		
DATE		07.07.07		DRAWING NO.	REV. A
				D212-664-247	SHEET 3 OF 3
				TITLE	SCALE
				CROSSTUBE (205/212 LOW AFT)	1:4

DRAWING NO. D212-664-247	TITLE CROSSTUBE	REV. A	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D212-664-247-A-1	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN <i>UP</i>	CHECKED <i>PH</i>	MFG. APPR. <i>AA</i>	APPROVED <i>MD</i>		DE APPR. <i>PH</i>		
DATE 09.05.01	DATE 09.06.15	DATE 09/06/22	DATE 09/06/22		DATE 09.06.22		

**CHANGE:**

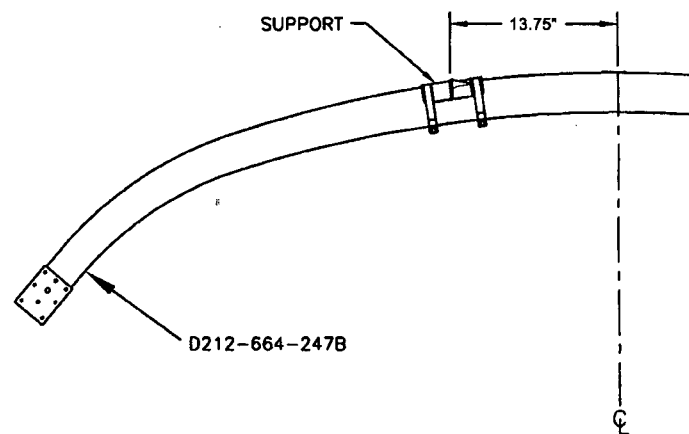
ADD THE FOLLOWING CROSSTUBE ASSEMBLY:

Part Number	Description
D212-664-247B	CROSSTUBE ASSEMBLY (214 LOW AFT)

THE D212-664-247B CROSSTUBE HAS THE SAME PARTS LIST AS THE D212-664-247 CROSSTUBE. HOWEVER, INSTALL THE SUPPORTS AS SHOWN IN FIGURE 1 OF THIS ENGINEERING ORDER. THE NEW KIT IS OTHERWISE ASSEMBLED PER THE D212-664-247 CROSSTUBE.

**RELEASED**  
09/26/22 *MD*

SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER  
NO. *53341*



**FIGURE 1 - SUPPORT INSTALLATION**

## 5.2 STANDARD GEAR CROSSTUBES

Item	-107	-207	-209	Part Number	Description
	X			D212-664-107	CROSSTUBE INSTALLATION, 204/205/210/212/214/412, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD FWD
		X		D212-664-207	CROSSTUBE INSTALLATION, 204/205/210/212/214, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD AFT
			X	D412-664-209	CROSSTUBE INSTALLATION, 412 STANDARD AFT
6	1			D212-664-147	CROSSTUBE ASSEMBLY, 204/205/210/212/214/412, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD FWD
7		1		D212-664-247	CROSSTUBE ASSEMBLY, 204/205/210/212/214, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD AFT
8			1	D412-664-249	CROSSTUBE ASSEMBLY, 412 STANDARD AFT
10	2			* D2893-1	SUPPORT
11	4			* D3595-063-450	RUBBER CUSHION
12	4			* MS21920-25	CLAMP (OR MS21042-26)
13	4			AN6-35A	BOLT
14	4			AN6-36A	BOLT
15	6			MS21042L6	NUT (OR MS21042-6)
16	18			AN960JD616	WASHER
20		2		* D2940-1	SUPPORT
21		4		* D3595-063-530	RUBBER CUSHION
22		4		* MS21920-28	CLAMP (OR MS21042-30)
23		4		AN6-40A	BOLT
24		2		AN6-41A	BOLT
25		6		MS21042L6	NUT (OR MS21042-6)
26		18		AN960JD616	WASHER
30			1	* D2896-1	SUPPORT
31			2	* D2856-600-1009	ABRASION STRIP
32			2	* D3595-063-570	RUBBER CUSHION
33			4	* MS21920-28	CLAMP
34			2	* MS21920-30	CLAMP (OR MS21042-32)
35			4	AN6-40A	BOLT
36			2	AN6-41A	BOLT
37			6	MS21042L6	NUT (OR MS21042-6)
38			18	AN960JD616	WASHER
39			2	* D3189-1	CHAFING SHIELD
45	2			* D3659-1	CUFF
46		2	2	* D3660-1	CUFF
47	44	44		* CR3212-4-06	RIVET (M7885/3-4-06)
48			44	* CR3212-4-07	RIVET (M7885/3-4-07)
50	1	1		D3428-1	PLACARD

\*REFERENCE ONLY. PARTS ARE INCLUDED IN D212-664-147/-247 OR D412-664-249 ASSEMBLIES ABOVE  
 NOTE: KITS INCLUDE EXTRA HARDWARE FOR COMPATIBILITY WITH BOTH DART AND BELL/AA  
 SKIDTUBES.

• COPYRIGHT © 2001 BY DART AEROSPACE LTD •  
 THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED  
 OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.

Revision: F  
 Date: 08.09.05



## LIQUID PENETRANT TEST REPORT

P- 1531

PAGE 1 OF 1

CLIENT DAT AEROSPACE DATE DEC 29-2003 TIME AM ☒ P  
ATTENTION LINDA / CRANTEL ACUREN JOB NO. 188-09-001085  
ADDRESS 1270 ABELDEEN ST PO/VO NO. 11012  
HAWKESBURY ON. WORK LOCATION SAME  
RdH 1K7 ACCEPTANCE STD. ASTM 1417 REV./DATE 2003  
PROJECT F.P.I. ON CROSS TUBES AND MACHINED PARTS  
ITEM(S) EXAMINED 4 CROSS TUBES  
11 MACHINED - STUDS. 2 COLLECTIVE BELL CRANK-W.O. 53

JOB DESCRIPTION PROCEDURE NO. LT0002 REV./DATE 1 TECHNIQUE NO. LT0002 REV./DATE 1  
PART NO. - 5/STEEL MATERIAL ALUMINUM THICKNESS -1/4"  
SCOPE WET FLUORESCENT LIQUID PENETRANT  
INSPECTION CARRIED OUT 100% EXTERNAL

## TEST DETAILS

METHOD ☒ FLUORESCENT ☐ VISIBLE ☒ WATER WASH 16459 ☐ SOLVENT REMOVABLE ☐ POST EMUL  
FAMILY BRAND MAGNAFLUX BLACK LIGHT S/N 4 ☐ OUTPUT > 1000  $\mu$ W/cm<sup>2</sup> ☐ AMBIENT <  
PENETRANT 2167 MINIMUM DWELL TIME 45 MIN. LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT > 100 fc @ 5  
PENETRANT REMOVER H-20 MINIMUM DRY TIME >10 MIN. OTHER CAS.VO  
DEVELOPER SD 52 MINIMUM DWELL TIME 10 MIN. LIGHT METER S/N 1098866 CAL DUE DATE 12-1  
DEVELOPER TYPE ☒ NON AQUEOUS ☐ AQUEOUS ☐ DRY

## TEST SURFACE

SURFACE CONDITION ☐ AS GROUND ☐ AS WELDED ☒ MACHINED ☐ SHOT BLASTED ☐ CLEAN BARE ME  
SURFACE TEMPERATURE ☐ < -4°C/ 20°F ☐ -4°C/ 20°F TO 10°C/50°F ☒ 10°C/50°F TO 52°C/125°F ☐ > 52°C/125°F

RESULTS- ( ☐ METRIC ☒ IMPERIAL )

1	CROSSTUBE-W.O. 53341	✓
1	CROSSTUBE-W.O. 53342	✓
1	CROSSTUBE-W.O. 54504	✓
1	CROSSTUBE-W.O. 54503	✓
11	STUDS -W.O. 50932	✓
2	COLLECTIVE BELL CRANK	✓
	W.O. 53635	

*not 108 01/04*

## Scope of Services

The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressed that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as well as data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

## Standard of Care

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

## SIGNATURES

CLIENT REPRESENTATIVE <u>Linda Crantel</u>	DTR # <u>E-27691</u>
TECHNICIAN (SIGNATURE): <u>Mike J. J. J.</u>	REPORT REVIEWED BY:
NAME (PRINT): <u>Mike J. J. J.</u>	NAME INIT
CGSB LEVEL <u>1</u> SNT LEVEL <u>1</u>	CGSB LEVEL SNT LEVEL
CGSB REG. NO. <u>6066</u>	CGSB REG. NO.

WHITE - CLIENT COPY

CANARY - OFFICE COPY

PINK - TECHNICIAN COPY

GOLD - OFFICE COPY

PT 1